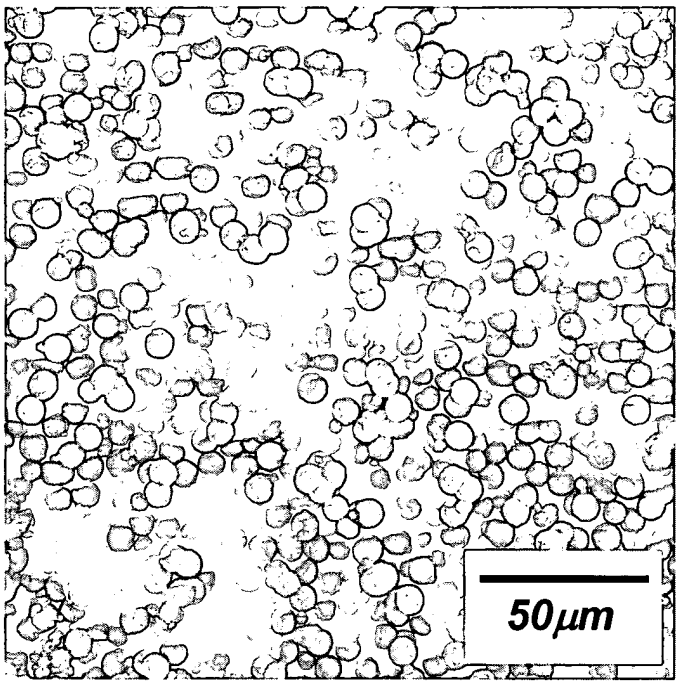

Figure 1a.

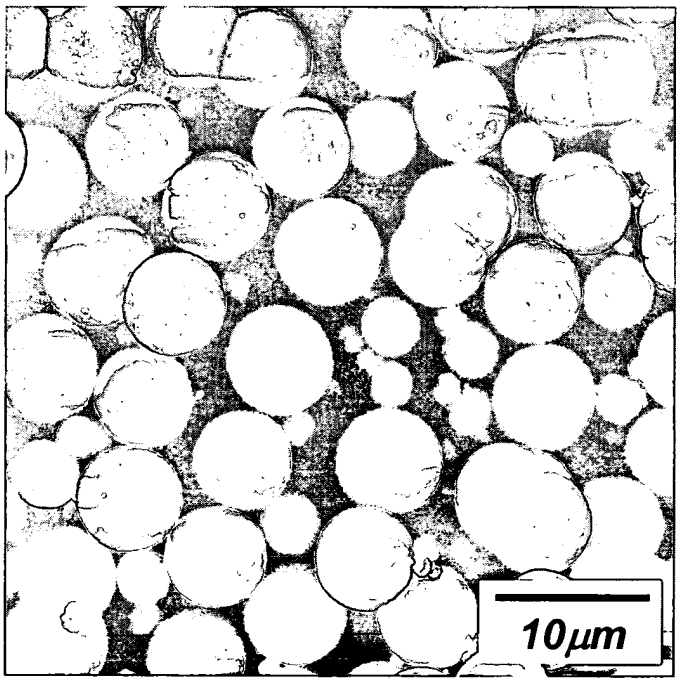

Figure 1b.

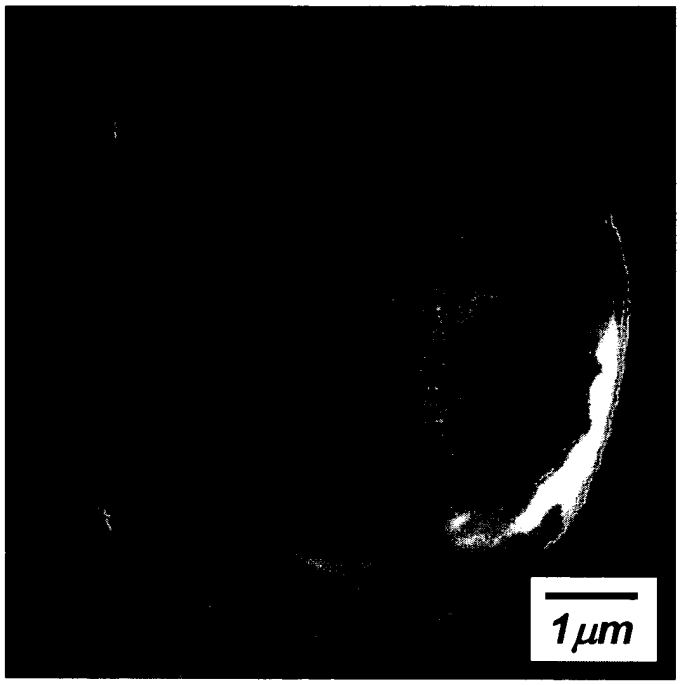

Figure 1c.

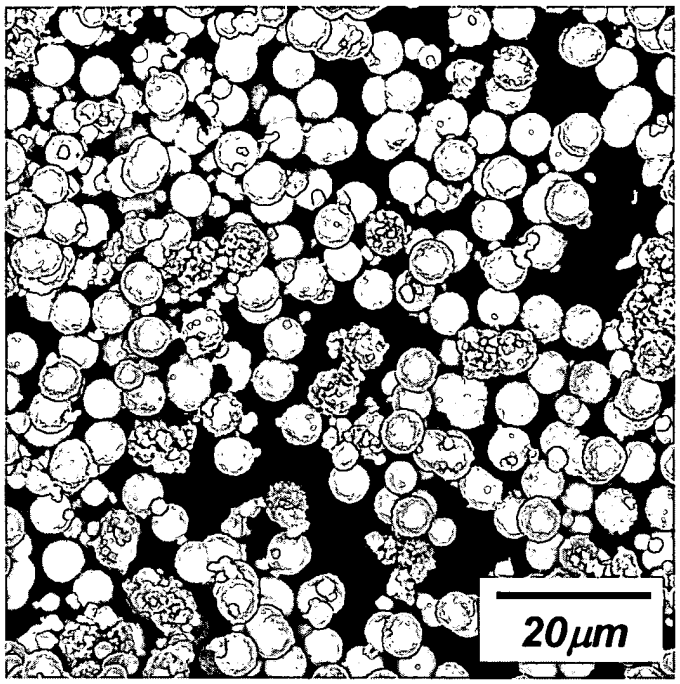

Figure 2a.

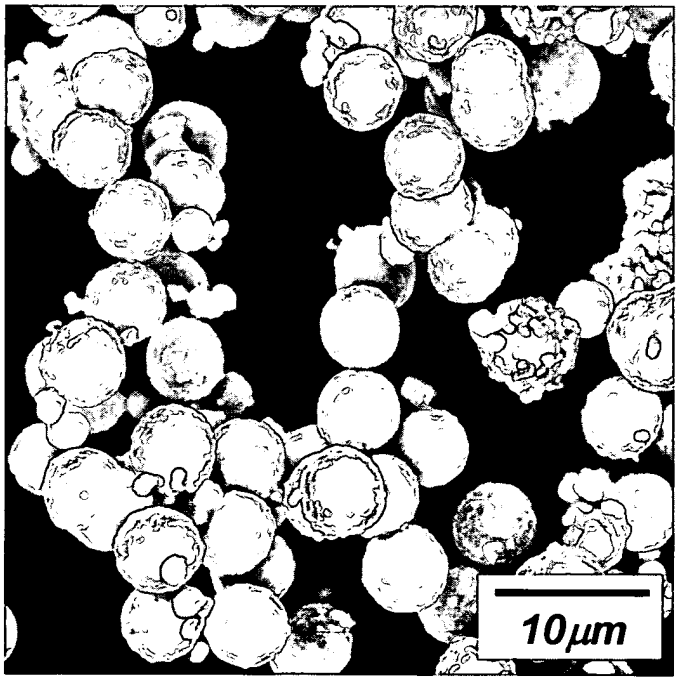

Figure 2b.

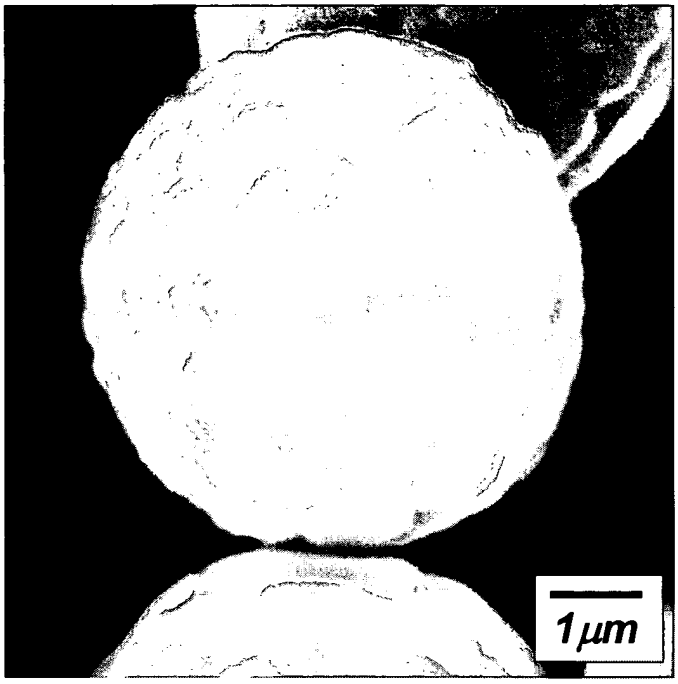

Figure 2c.

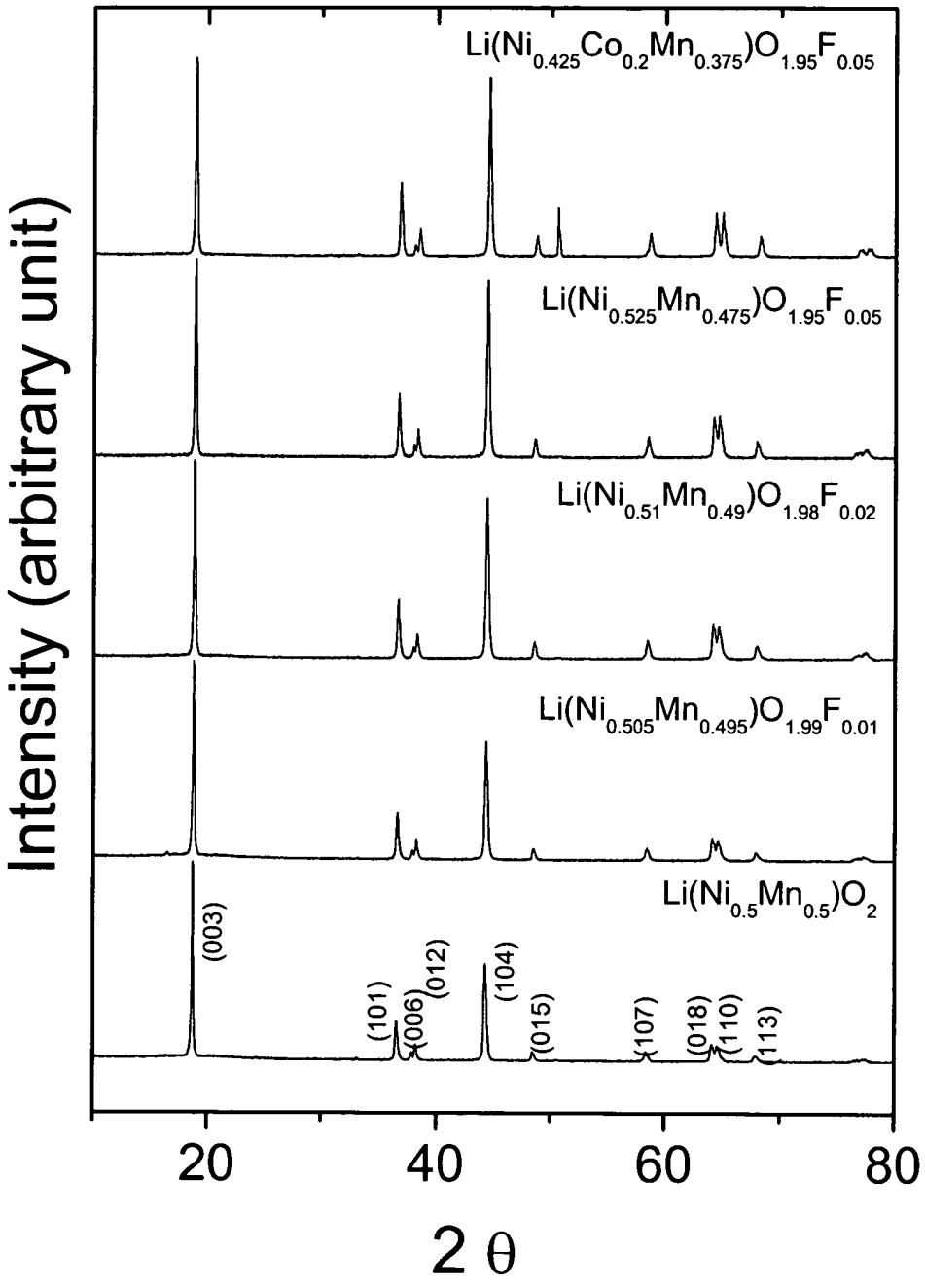
Li(Ni0.425Co0.2Mn0.375)O1.95F0.05
Li(Ni0.525Mn0.475)O1.95F0.05
Li(Ni0.51Mn0.49)O1.98F0.02
Li(Ni0.505Mn0.495)O1.99F0.01
Li(Ni0.5Mn0.5)O2
(003)
(101)
(006)
(012)
(104)
(015)
(107)
(018)
(110)
(113)
Intensity (arbitrary unit)
20
40
60
80
2 θ

Figure 3.

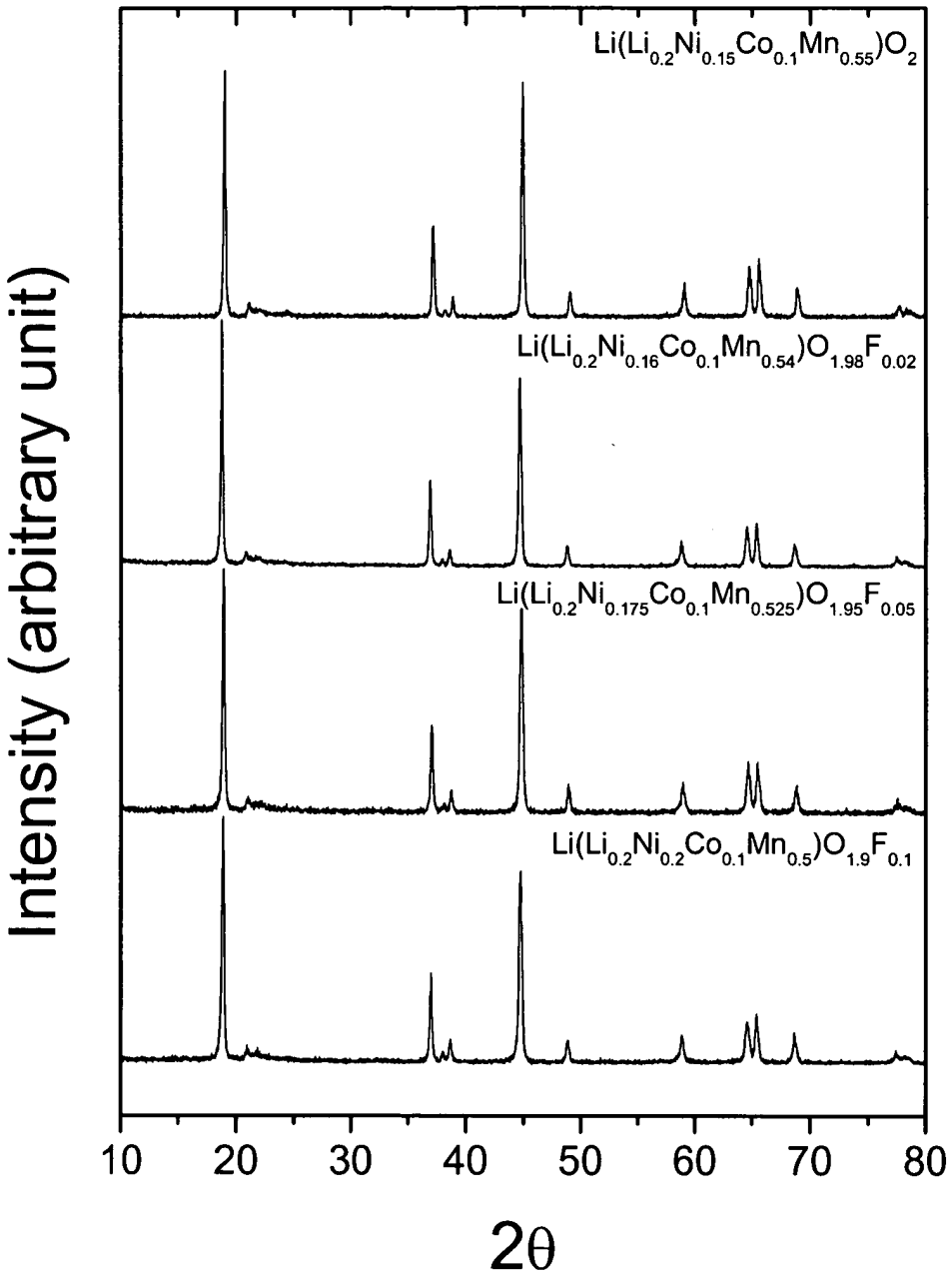
Li(Li0.2Ni0.15Co0.1Mn0.55)O2
Li(Li0.2Ni0.16Co0.1Mn0.54)O1.98F0.02
Li(Li0.2Ni0.175Co0.1Mn0.525)O1.95F0.05
Li(Li0.2Ni0.2Co0.1Mn0.5)O1.9F0.1
Intensity (arbitrary unit)
10
20
30
40
50
60
70
80
2θ

Figure 4.

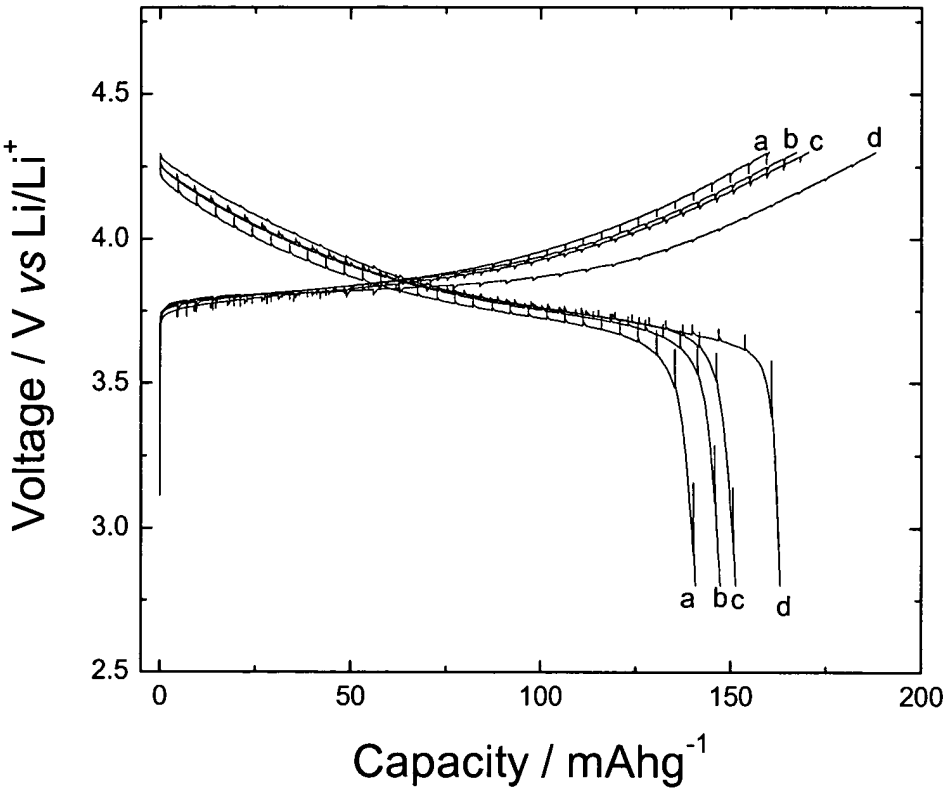

Figure 5. The first charge/discharge curves of $Li(Ni_{\alpha}Mn_{\beta}Co_{\gamma})O_{2-z}F_z$.
(a) α=0.5, β=0.5, γ=0, z=0; (b) α=0.505, β=0.495, γ=0, z=0.01;
(c) α=0.51, β=0.49, γ=0, z=0.02; (d) α=0.41, β=0.39, γ=0.2, z=0.02

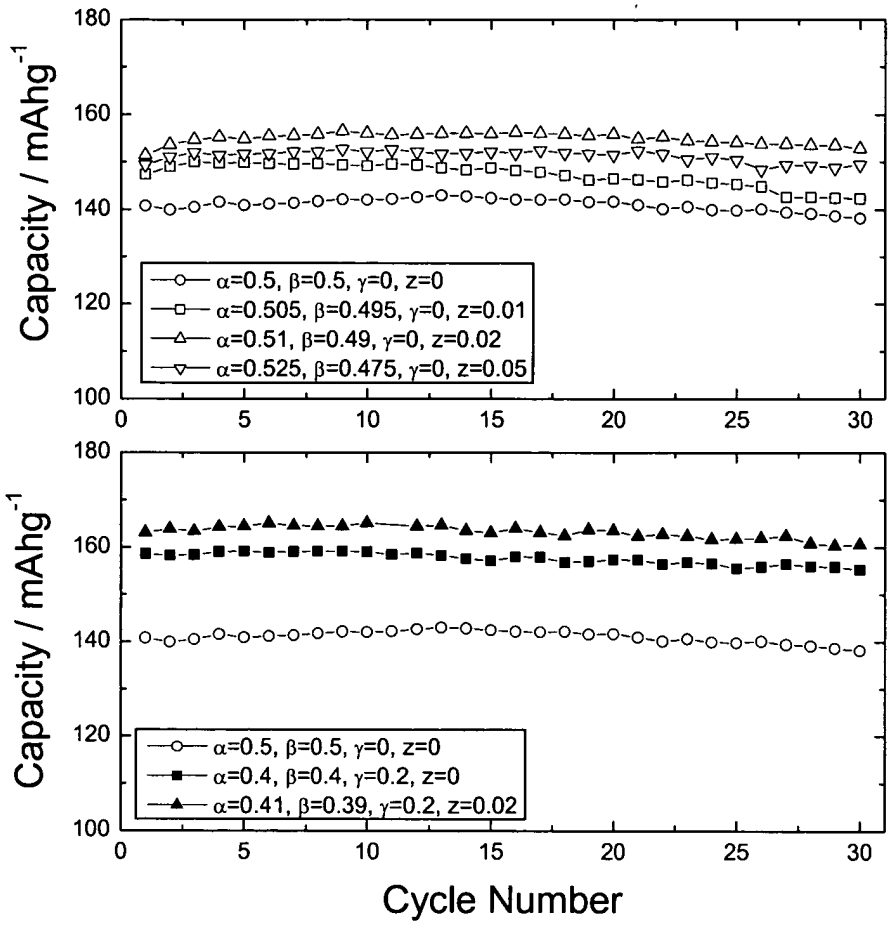

Figure 6. Vairation of discharge capacity with cycling number of $Li(Ni_{\alpha}Mn_{\beta}Co_{\gamma})O_{2-z}F_{z}$.

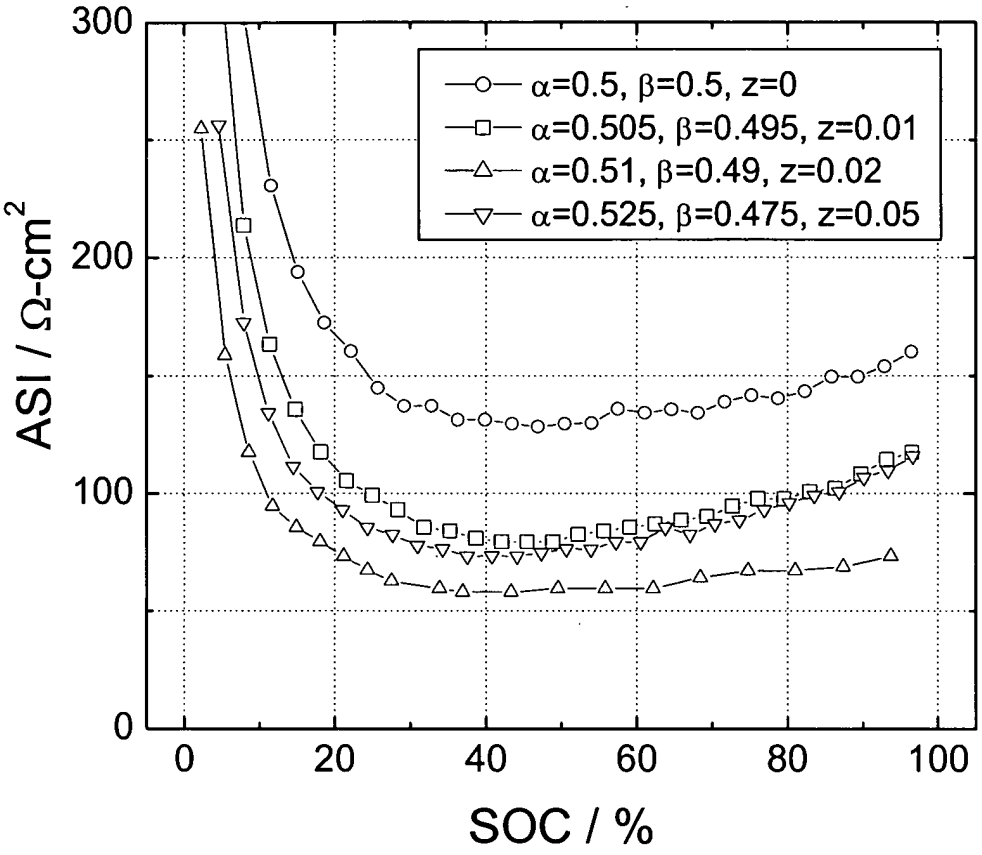

Figure 7. Area specific impedance (ASI) as a function of state of charge (SOC) of $Li(Ni_{\alpha}Mn_{\beta})O_{2-z}F_z$.

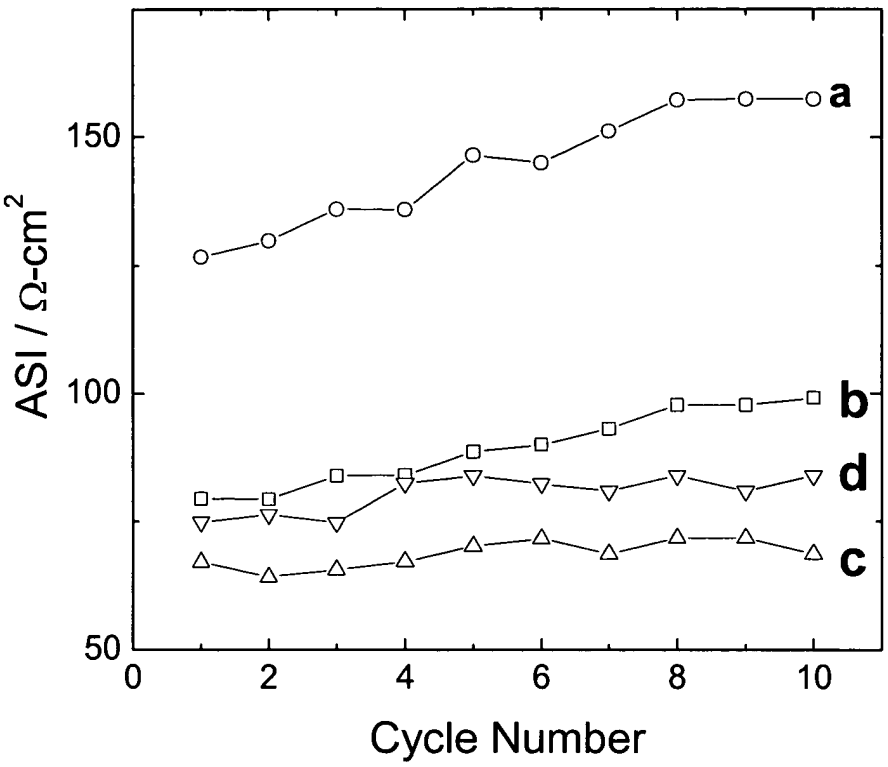

Figure 8. Variation of ASI at 50% SOC of $Li(Ni_{\alpha}Mn_{\beta})O_{2-z}F_z$.
(a) α=0.5, β=0.5, z=0; (b) α=0.505, β=0.495, z=0.01
(c) α=0.51, β=0.49, z=0.02; (d) α=0.525, β=0.475, z=0.05

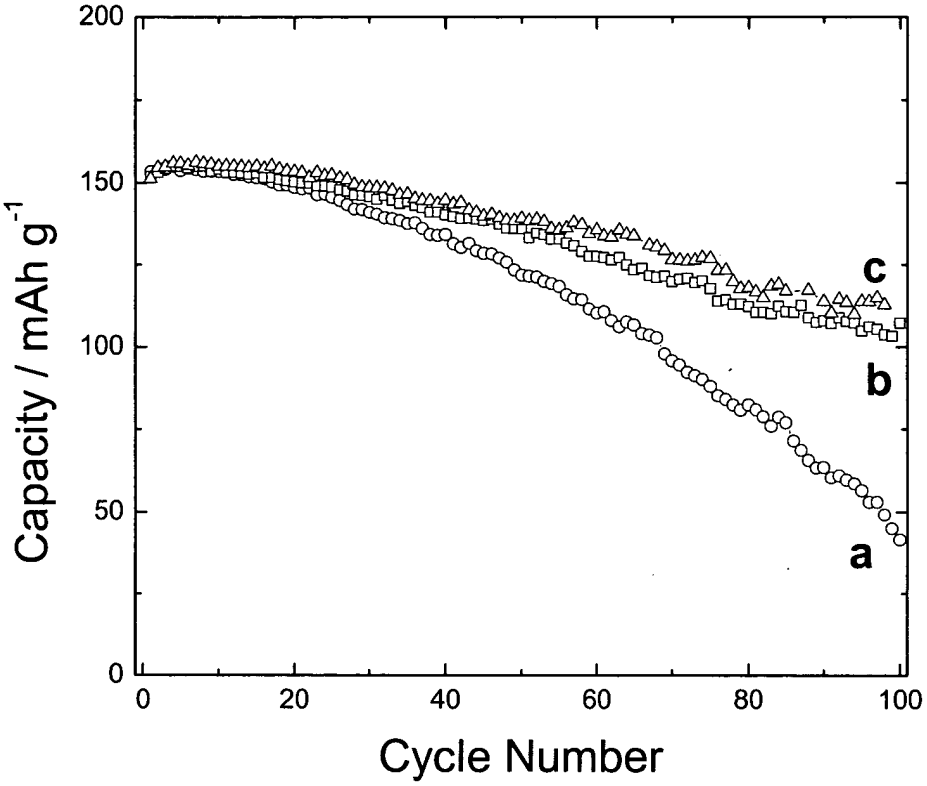

Figure 9. Variation of discharge capacity with cycling of Li/ $Li(Ni_{\alpha}Mn_{\beta}Co_{\gamma})O_2$ cells at room temperature.

(a) α=0.4, β=0.4, γ=0.2, uncoated;

(b) α=0.4, β=0.4, γ=0.2, coated with 0.5wt% Al-isopropoxide;

(c) α=0.4, β=0.4, γ=0.2, coated with 1.0wt% Al-isopropoxide.

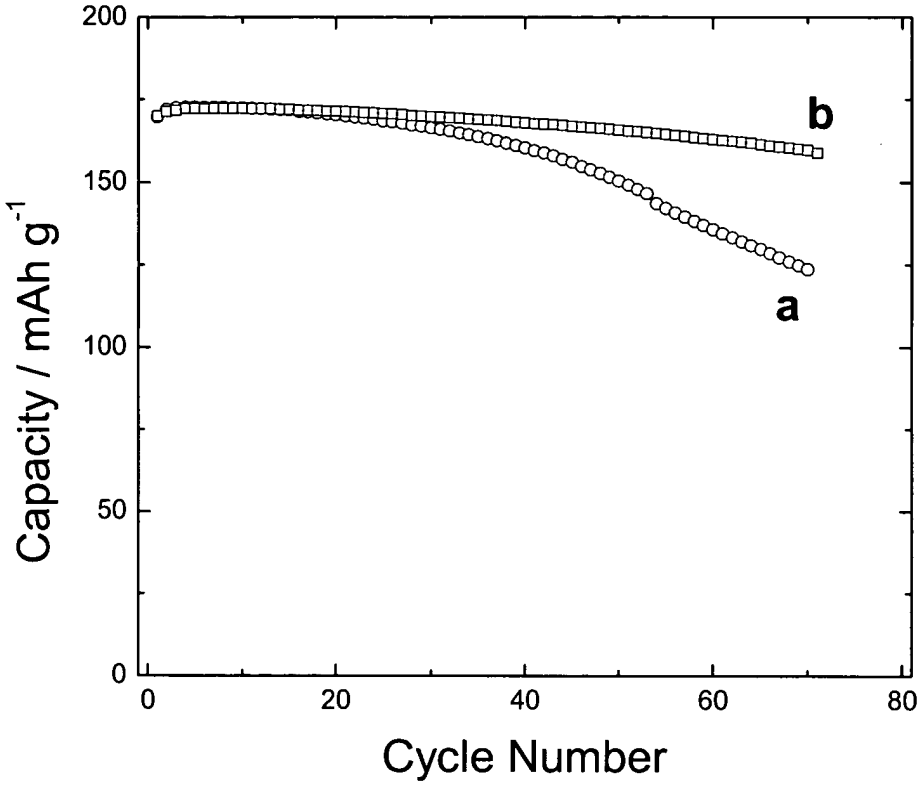

Figure 10. Variation of discharge capacity with cycling of Li/ $Li(Ni_{\alpha}Mn_{\beta}Co_{\gamma})O_2$ cells at 55°C.

(a) α=0.4, β=0.4, γ=0.2, uncoated;

(b) α=0.4, β=0.4, γ=0.2, coated with 0.5wt% Al-isopropoxide.

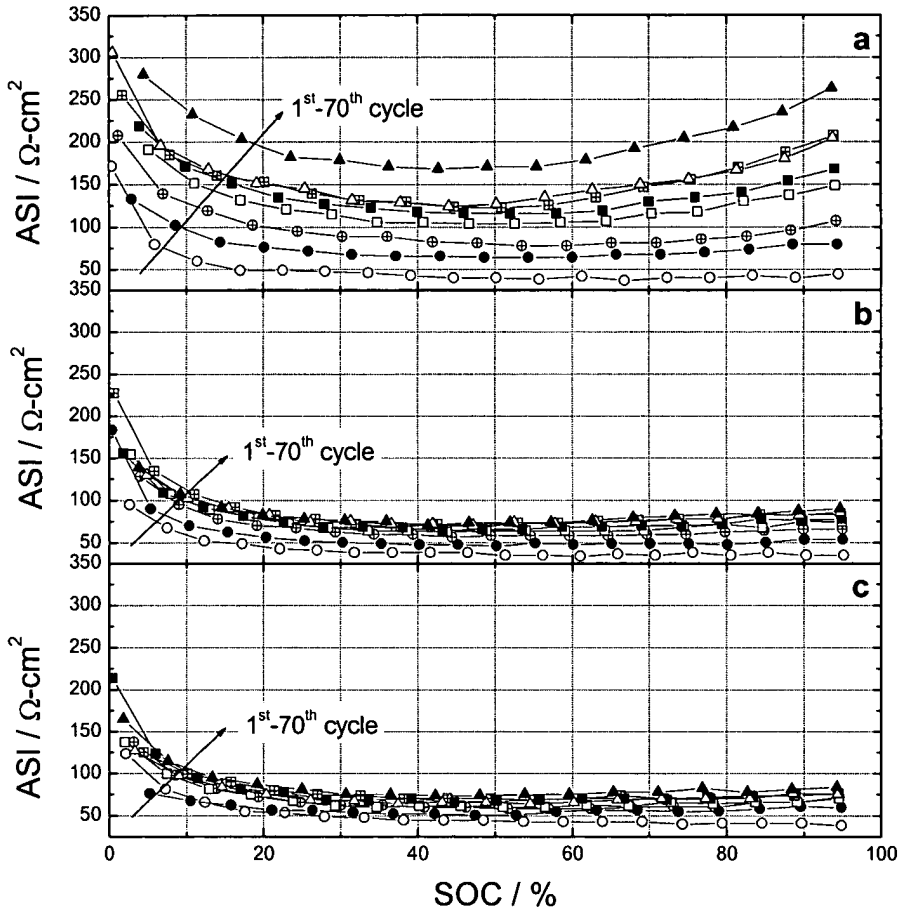

Figure 11. Variation of area specific impedance (ASI) with cycling measured with C/ $Li(Ni_{\alpha}Mn_{\beta}Co_{\gamma})O_2$ cells.

(a) α=0.4, β=0.4, γ=0.2, uncoated;

(b) α=0.4, β=0.4, γ=0.2, coated with 0.5wt% Al-isopropoxide;

(c) α=0.4, β=0.4, γ=0.2, coated with 1.0wt% Al-isopropoxide.

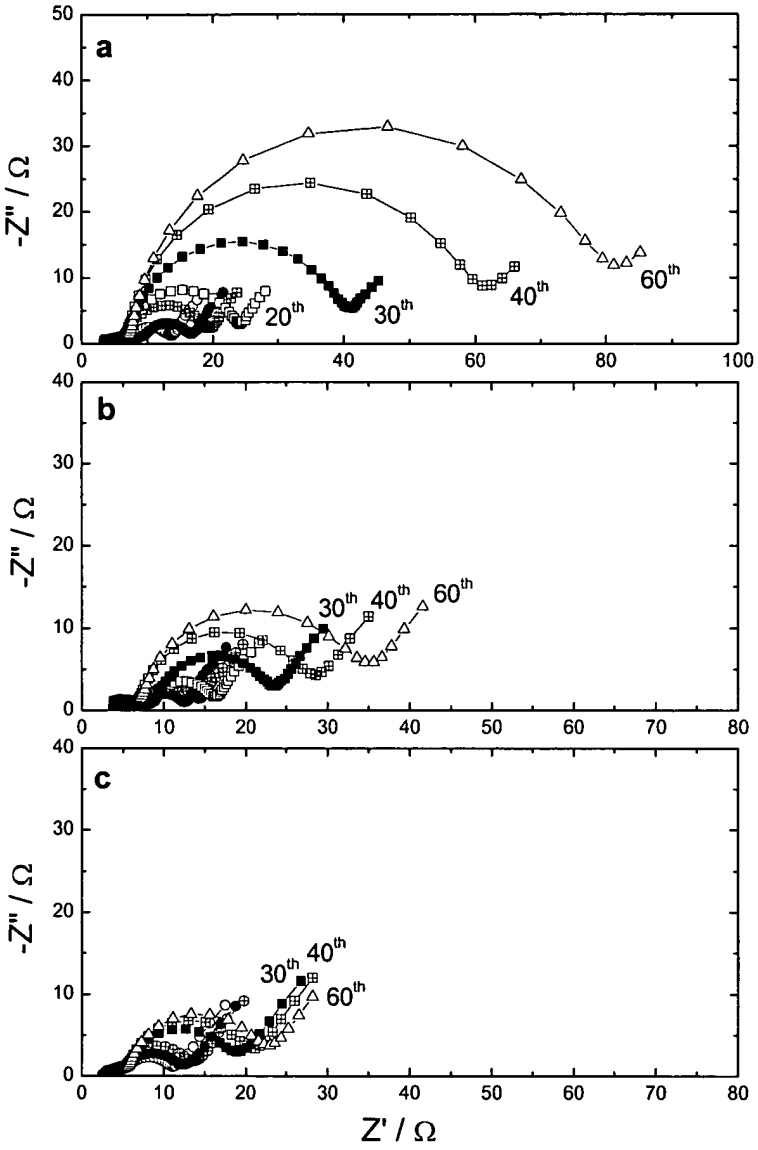

Figure 12. Variation of a.c. impedance
with cycling measured with C/ $Li(Ni_{\alpha}Mn_{\beta}Co_{\gamma})O_2$ cells.

(a) α=0.4, β=0.4, γ=0.2, uncoated;

(b) α=0.4, β=0.4, γ=0.2, coated with 0.5wt% Al-isopropoxide;

(c) α=0.4, β=0.4, γ=0.2, coated with 1.0wt% Al-isopropoxide.

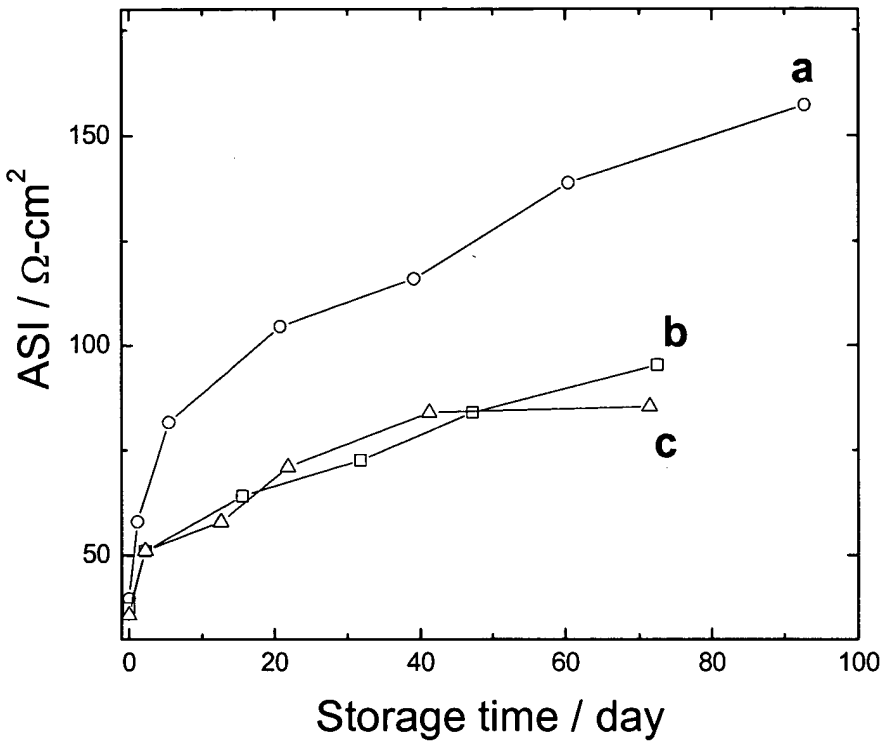

Figure 13. Variation of area specific impedance at 60% SOC with 55°C-storage time measured with C/ $Li(Ni_{\alpha}Mn_{\beta}Co_{\gamma})O_2$ cells.
(a) α=0.4, β=0.4, γ=0.2, uncoated;
(b) α=0.4, β=0.4, γ=0.2, coated with 0.5wt% Al-isopropoxide;
(c) α=0.4, β=0.4, γ=0.2, coated with 1.0wt% Al-isopropoxide.

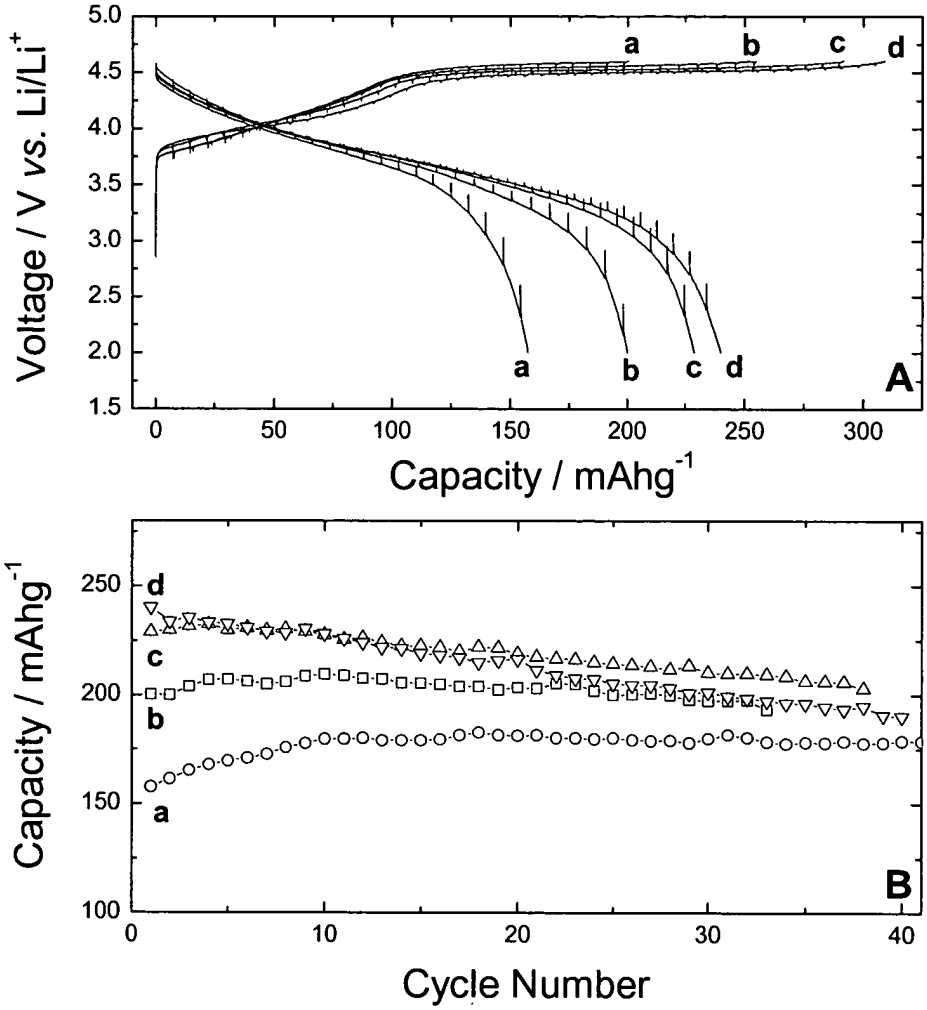

Figure 14. The first charge/discharge curves (A) and cycling performance (B) of $Li/Li_{1+x}(Ni_{\alpha}Mn_{\beta}Co_{\gamma})O_2$ cells.

(a) x=0.2, α=0.2, β=0.6, γ=0;

(b) x=0.2, α=0.195, β=0.595, γ=0.01;

(c) x=0.2, α=0.175, β=0.575, γ=0.05;

(d) x=0.2, α=0.15, β=0.55, γ=0.10.

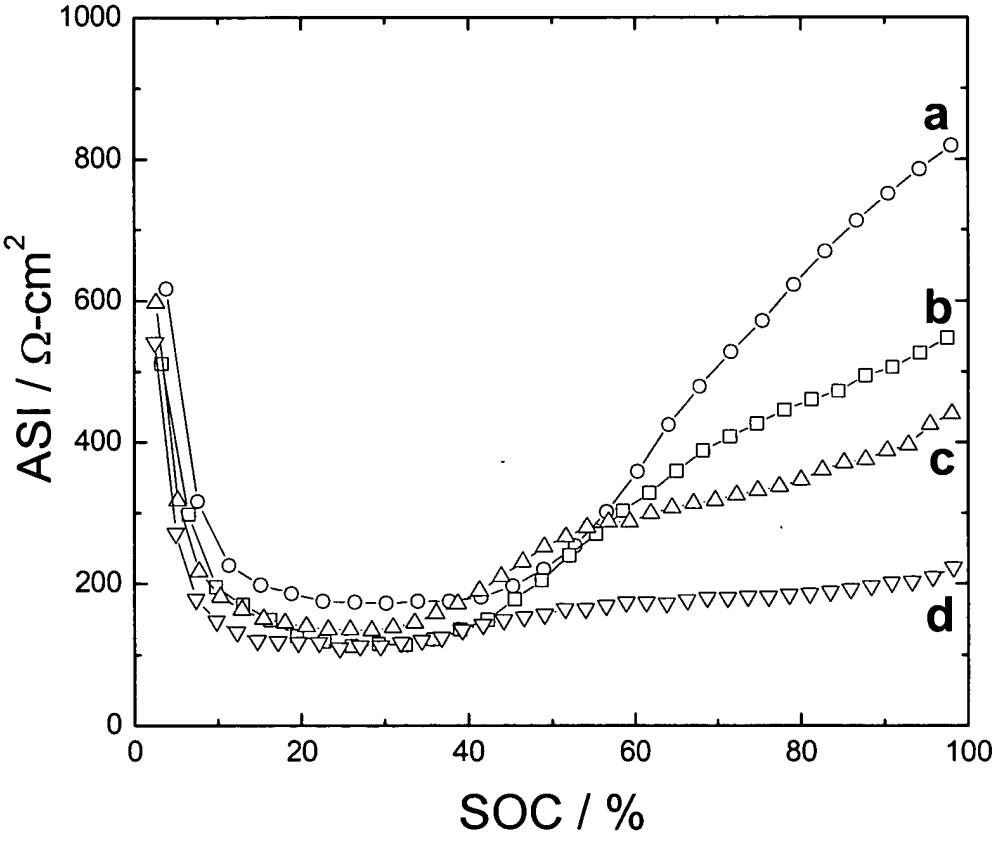

Figure 15. The area specific impedance as a function of state of charge of $C/Li_{1+x}(Ni_{\alpha}Mn_{\beta}Co_{\gamma})O_2$ cells.

(a) $x=0.2$, $\alpha=0.2$, $\beta=0.6$, $\gamma=0$;
(b) $x=0.2$, $\alpha=0.195$, $\beta=0.595$, $\gamma=0.01$;
(c) $x=0.2$, $\alpha=0.175$, $\beta=0.575$, $\gamma=0.05$;
(d) $x=0.2$, $\alpha=0.15$, $\beta=0.55$, $\gamma=0.10$.

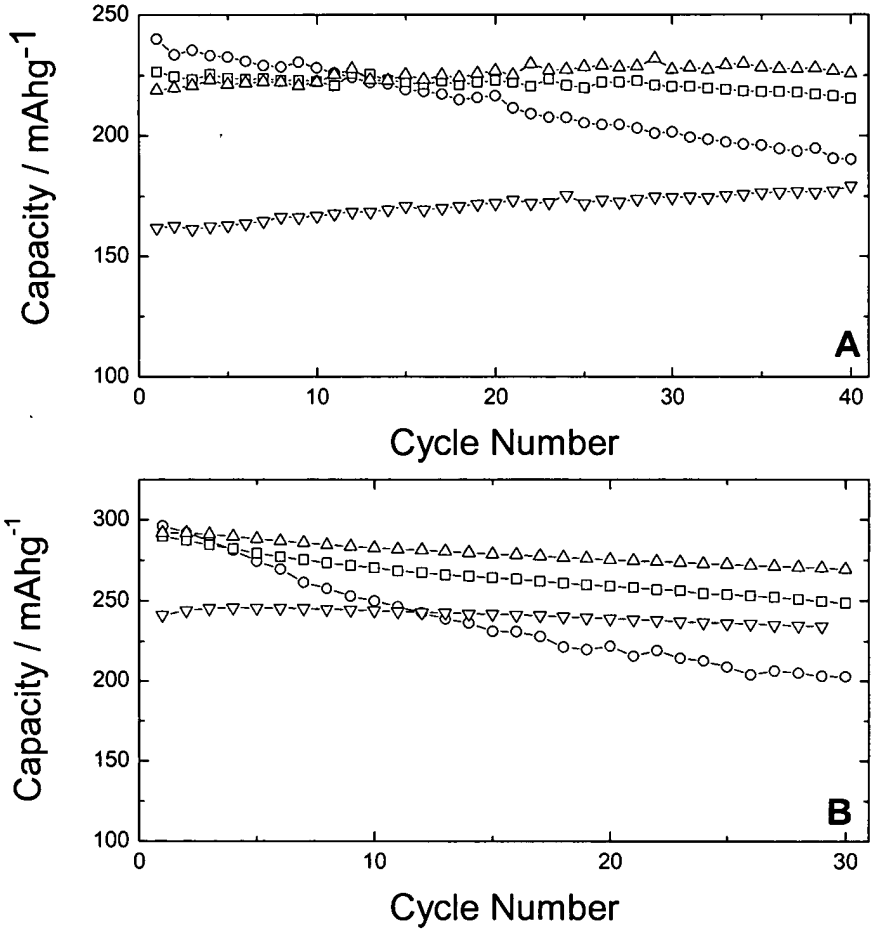

Figure 16. Cycling performance of $Li/Li_{1+x}(Ni_{\alpha}Mn_{\beta}Co_{\gamma})O_{2-z}F_z$ cells at room tempearture (A) and at 55°C (B).

(a) —○— x=0.2, α=0.15, β=0.55, γ=0.1, z=0;

(b) —□— x=0.2, α=0.16, β=0.54, γ=0.1, z=0.02;

(c) —△— x=0.2, α=0.175, β=0.525, γ=0.1, z=0.05;

(d) —▽— x=0.2, α=0.2, β=0.5, γ=0.1, z=0.1.

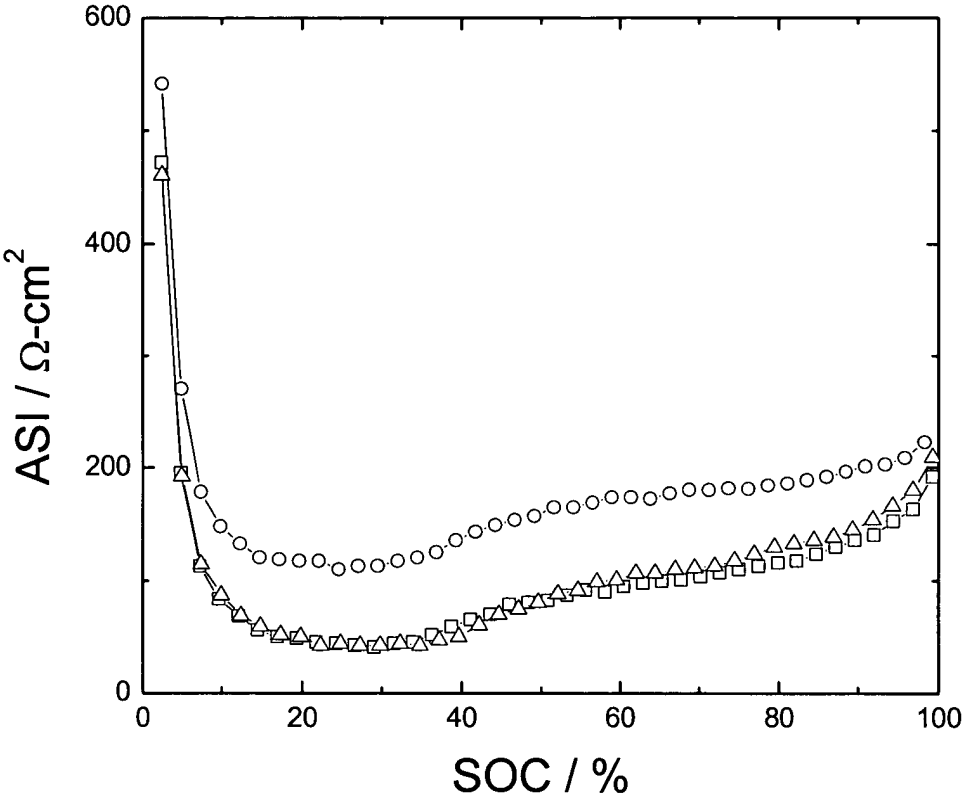

Figure 17. The area specific impedance of $C/Li_{1+x}(Ni_{\alpha}Mn_{\beta}Co_{\gamma})O_{2-z}F_z$ cells as a function of SOC.

—○— x=0.2, α=0.15, β=0.55, γ=0.1, z=0;

—□— x=0.2, α=0.16, β=0.54, γ=0.1, z=0.02;

—△— x=0.2, α=0.175, β=0.525, γ=0.1, z=0.05.